

What we claim is:

1. A stabilized power supply unit for supplying an output voltage, comprising:

a voltage control circuit for outputting a voltage control signal in accordance with the difference between the output feedback voltage associated with said output voltage and a reference voltage;

an output circuit for outputting said output voltage under the control of said voltage control signal; and

a current limiting circuit having

a current detection unit for passing therethrough a detection current associated with said output current of the output circuit, under the control of said voltage control signal; and

a current limiting signal generation unit for generating a current limiting signal to limit said output current when said detection current exceeds a predetermined level, wherein

said current limiting circuit is provided with a voltage correction unit connected between said current detection unit and said current limiting signal generation unit, and supplied with said output voltage, and wherein

the voltage at the output end of said current detection unit set to, or close to, said output voltage.

2. The stabilized power supply unit according to claim 1, wherein

said output circuit has an output transistor connected between a power source and the output terminal of said power supply unit, adapted to control said output transistor by said voltage control signal to output a constant output voltage from said output transistor;

said current detection unit has a current detection transistor of the same type and of the same conduction type as said output transistor, and controls said current detection transistor by said voltage control signal to obtain a detection current proportional to said output current.

3. The stabilized power supply unit according to claim 2, wherein said voltage correction unit has

a first transistor provided between said current detection unit and said current limiting signal generation unit;

a second transistor supplied with said output voltage as a control input signal to control said first transistor; and

a current source for driving said first and second transistors.

4. The stabilized power supply unit according to claim 3, wherein said current source is enabled by a current-source control signal generated when said output current exceeds a predetermined current level set below the allowable maximum output current of said power supply unit.

5. The stabilized power supply unit according to claim 4, wherein said current-source control signal is generated based on the level of said voltage control signal.

6. The stabilized power supply unit according to claim 4, further comprising a current-source control circuit having:

a current-source control transistor having the same type and same conduction type as said current detection transistor, and adapted to be controlled by said voltage control signal; and

conversion means, connected in series with said current-source control transistor, for converting the current passing through said current-source control transistor into said current-source control signal.

7. The stabilized power supply unit according to claim 3, wherein said current source is a constant current source.

8. The stabilized power supply unit according to claim 2, wherein said voltage correction unit has

a first transistor provided between said current detection unit and said current limiting signal generation unit;

voltage dropping element for supplying said output voltage as a control input signal to said first transistor; and

a current source for driving said first transistor and said voltage dropping element.

9. The stabilized power supply unit according to claim 8, wherein said voltage dropping element is a diode.

10. The stabilized power supply unit according to claim 9, wherein said current source is enabled by a current-source control signal generated when said output current exceeds a predetermined current level set below the maximum allowable limit of said output current.

11. The stabilized power supply unit according to claim 10, wherein said current-source control signal is generated based on the level of said voltage control signal.

12. The stabilized power supply unit according to claim 10, further comprising a current-source control circuit having:

a current-source control transistor having the same type and same conduction type as said current detection transistor, and adapted to be controlled by said voltage control signal; and

conversion means, connected in series with said current-source control transistor, for converting the current passing through said current-source control transistor into said current-source control signal.

13. The stabilized power supply unit according to claim 9, wherein said current source is a constant current source.

14. The stabilized power supply unit according to claim 1, wherein

said voltage control circuit has a differential amplifier for amplifying the difference between said output feedback voltage and said reference voltage to output said voltage control signal in accordance with said difference, and

said current limiting signal is coupled to said voltage control circuit so as to regulate the amplified output of said differential amplifier.

15. The stabilized power supply unit according to claim 1, wherein

said voltage control circuit has a differential amplifier for amplifying the difference between said output feedback voltage and said reference voltage to output said voltage control signal in accordance with said difference, and

said current limiting signal is coupled to said voltage control circuit so as to regulate either one of said output feedback voltage and said reference voltage.